

Legacy Sediment Site Report for the Dubakella Plantations Insect and Disease Project

Shasta-Trinity National Forest



Prepared by:

David Schmerge
May 2019

INTRODUCTION

An inventory of controllable sediment discharge sources and other legacy sites that may affect water quality within project boundaries and along appurtenant Forest Service roads is required for NEPA analyses for timber harvest, fuels, and vegetation management actions that include ground-disturbing activities¹ (USDA Forest Service, 2017). A purpose of this report is to comply with this direction by summarizing the known sediment sources that lie within the proposed boundaries of the Dubakella Plantations Insect and Disease project².

The *Waiver of Waste Discharge Requirements for Nonpoint Source Discharges Related to Certain Federal Land Management Activities on NFS Lands in the North Coast Region* (Waiver) addresses nonpoint source discharges of waste to waters of California from activities associated with specific uses of NFS lands (Cal. Regional Water Quality Control Board, 2015). The North Coast Regional Water Quality Control Board (Regional Water Board) has identified this project as Category B, so the Waiver requires that all legacy sediment sites within the project boundaries must be identified, inventoried, prioritized, scheduled, and implemented for treatment. Trading the treatment of legacy sediment sites inside a Category B project area with legacy sediment sites outside of the project area may be acceptable, provided the treatment sites are within the same sixth field subwatershed and it can be demonstrated that the proposed treatments provide an equal or greater benefit to water quality³. Such alternatives shall be submitted to the Executive Officer for approval. A purpose of this report is to comply with the Waiver.

IDENTIFICATION

A legacy sediment site meets all of the following conditions (Cal. Regional Water Quality Control Board, 2015):

- is discharging or has the potential to discharge sediment to waters of the state in violation of applicable water quality requirements;
- was caused or affected by human activity; and
- may feasibly and reasonably respond to prevention and minimization management activities.

Roads are the dominant sources of sediment caused by human activities (US EPA, 1998). Road related sediment reduction targets for the South Fork Trinity River sub-basin include the following:

- less than one percent of stream crossings should fail or divert water as a result of a 100-year or smaller flood,
- the length of hydrologically connected roads that drain surface runoff directly into streams should be reduced,

¹ Chapter 10 of the Region 5 Soil and Water Conservation Handbook (Amendment No. 2509.22-2011-1) expired in 2016. Its replacement has not yet been approved, but is available in draft form.

² The Dubakella Plantations Insect and Disease project lies entirely within the sixth field Dubakella subwatershed.

³ Finding no. 34 of the Waiver, page 13.

- roads that aren't needed should be decommissioned or hydrologically closed (culverts and fills removed).

Legacy sediment sites that are identified in this report include undersized stream crossing culverts, stream crossings with diversion potential, hydrologically connected roads, and roads that aren't needed. All road/stream crossings within the project area (and some road/stream crossings outside the project area but within the same sixth field subwatershed) have been inspected in the field and analyzed in the office. Culvert dimensions and bankfull widths have been measured. Crossings with diversion potential and hydrologically connected roads have been identified. The culvert size for a 100-year flood peak flow plus debris has been estimated using the model StreamStats (Ries III and others, 2017) and the Federal Highway Administration culvert capacity nomograph with a 0.67 headwall-to-culvert diameter ratio (Weaver and others, 2015).

INVENTORY

Legacy sediment sites identified within the Dubakella subwatershed include 48 stream crossings (Appendix A and Table 1). 29 of the sites are located within the project area; the total fill volume of these sites is approximately 20,000 cubic yards. 26 of the legacy sediment sites are located on five closed roads (29N12, 29N32A, 29N43D, 29N46, 30N16B); the total fill volume of these sites is approximately 7,000 cubic yards. The five closed roads are designated as closed, but they have not been hydrologically closed; the total length of these roads is about 6 miles. Seven of the legacy sediment sites located on closed roads are also located in the project area (D27, D28, D29, D34, D36, D43, and D60).

Table 1. Inventoried legacy sediment sites in the Dubakella Subwatershed.

ID	Latitude	Longitude	Fill Volume ⁴	Inside Project Area?	Road Closed?	Problem(s)
D02	40.3167	-123.1043	381	Yes	No	undersized culvert, diversion potential, hydrologically connected
D03	40.3570	-123.0984	897	Yes	No	undersized culvert, diversion potential, hydrologically connected
D04	40.3507	-123.1111	2960	Yes	No	undersized culvert, hydrologically connected
D07	40.3790	-123.0517	67	Yes	No	undersized culvert, diversion potential, hydrologically connected, headcut ~ 100 ft upstream of inlet
D08	40.3765	-123.0520	62	Yes	No	undersized culvert
D09	40.3763	-123.0524	194	Yes	No	undersized culvert, hydrologically connected

⁴ Cubic yards.

Legacy Sediment Site Report for the Dubakella Plantations Insect and Disease Project

D10	40.3792	-123.0529	1049	Yes	No	undersized culvert, hydrologically connected
D11	40.3452	-123.0706	710	Yes	No	diversion potential, hydrologically connected
D12	40.4093	-123.0729	4232	Yes	No	undersized culvert, hydrologically connected
D13	40.4016	-123.0307	845	Yes	No	undersized culvert
D14	40.3497	-123.1262	2165	Yes	No	undersized culvert, hydrologically connected
D17	40.3556	-123.0911	708	Yes	No	undersized culvert, diversion potential, hydrologically connected
D19	40.3550	-123.0486	538	Yes	No	undersized culvert, diversion potential
D20	40.3638	-123.0677	169	Yes	No	undersized culvert, diversion potential, hydrologically connected
D21	40.3544	-123.0635	309	Yes	No	undersized culvert, hydrologically connected
D22	40.3225	-123.0667	183	Yes	No	undersized culvert, diversion potential, hydrologically connected
D23	40.2972	-123.0772	148	Yes	No	undersized culvert, hydrologically connected
D25	40.3327	-123.1055	428	Yes	No	undersized culvert, hydrologically connected
D27	40.4322	-123.0147	1102	Yes	Yes	undersized culvert
D28	40.3155	-123.0783	355	Yes	Yes	undersized culvert, hydrologically connected
D29	40.3533	-123.1091	134	Yes	Yes	undersized culvert, diversion potential, hydrologically connected
D30	40.3564	-123.1123	0	No	Yes	hydrologically connected
D32	40.3502	-123.1361	75	No	Yes	undersized culvert, hydrologically connected
D34	40.3709	-123.1370	70	Yes	Yes	undersized culvert, hydrologically connected
D35	40.4294	-123.0171	385	No	Yes	undersized culvert, diversion potential, hydrologically connected
D36	40.3543	-123.1092	332	Yes	Yes	undersized culvert, diversion potential, hydrologically connected
D37	40.3569	-123.1145	711	No	Yes	undersized culvert
D38	40.3583	-123.1156	340	No	Yes	undersized culvert, hydrologically connected
D43	40.3488	-123.1366	0	Yes	Yes	hydrologically connected
D44	40.3649	-123.1262	119	No	Yes	undersized culvert, diversion potential, hydrologically connected

Legacy Sediment Site Report for the Dubakella Plantations Insect and Disease Project

D45	40.3666	-123.1346	258	No	Yes	undersized culvert, diversion potential, hydrologically connected
D46	40.3670	-123.1350	760	No	Yes	undersized culvert, hydrologically connected
D47	40.3715	-123.1377	44	No	Yes	undersized culvert, hydrologically connected
D48	40.3739	-123.1393	152	No	Yes	undersized culvert, hydrologically connected
D49	40.3742	-123.1398	146	No	Yes	undersized culvert, diversion potential, hydrologically connected
D50	40.3752	-123.1408	440	No	Yes	undersized culvert, hydrologically connected
D51	40.3759	-123.1420	137	No	Yes	undersized culvert, hydrologically connected
D52	40.3757	-123.1434	704	No	Yes	undersized culvert, hydrologically connected
D53	40.3749	-123.1448	46	No	Yes	undersized culvert
D54	40.3746	-123.1455	332	No	Yes	undersized culvert, diversion potential, hydrologically connected
D55	40.3734	-123.1463	119	No	Yes	undersized culvert
D56	40.3734	-123.1498	256	No	Yes	undersized culvert
D57	40.3709	-123.1524	412	No	Yes	undersized culvert, hydrologically connected
D58	40.3370	-123.1068	651	Yes	No	undersized culvert, hydrologically connected
D59	40.3340	-123.1093	121	Yes	No	undersized culvert, hydrologically connected
D60	40.3618	-123.0667	23	Yes	Yes	undersized culvert, hydrologically connected
D61	40.3608	-123.0519	1047	Yes	No	undersized culvert, diversion potential, hydrologically connected
D62	40.3641	-123.0409	34	Yes	No	undersized culvert, hydrologically connected

PRIORITIZATION

Prioritization criteria for legacy sediment sites have been used to score the priority for treatment of each of the legacy sediment sites in the Dubakella subwatershed⁵. The score of each site has been compared to all the identified legacy sediment sites on the west side of the Shasta Trinity National Forest. The legacy sediment sites located in the Dubakella subwatershed are rated moderate-low to high priority (Appendix A).

⁵ Prioritization criteria are describe in Appendix B.

TREATMENT

Treatments for each of the legacy sediment sites are proposed in Table 2. Best management practices that are to be used in treating all the sites are identified in Appendix B.

Table 2. Proposed treatments of legacy sediment sites in the Dubakella subwatershed.

ID	Proposed Treatment
D02	Replace existing 2.5 ft culvert with 8 ft culvert. Install 2 cross-drain culverts.
D03	Replace existing 2 ft culvert with 5 ft culvert. Construct critical dip and rolling dip.
D04	Replace existing 2 ft culvert with 5 ft culvert. Construct rolling dip.
D07	Replace existing 1.5 ft culvert with 5 ft culvert. Construct critical dip and rolling dip. Add riprap at the headcut.
D08	Replace existing 2 ft culvert with 6 ft culvert.
D09	Replace existing 2 ft culvert with 6 ft culvert. Construct rolling dip.
D10	Replace existing 1.5 ft culvert with 5 ft culvert. Construct rolling dip.
D11	Construct critical dip and rolling dip.
D12	Replace existing 2 ft culvert with 3 ft culvert. Construct rolling dips.
D13	Replace existing 2 ft culvert with 5.5 ft culvert.
D14	Replace existing 3 ft culvert with a 5 ft culvert. Construct rolling dips.
D17	Replace existing 2 ft culvert with 3.5 ft culvert. Construct critical dip and rolling dip.
D19	Replace existing 1.5 ft culvert with 2.5 ft culvert. Construct critical dip.
D20	Replace existing 1.5 ft culvert with 3 ft culvert. Construct critical dip and rolling dip.
D21	Replace existing 1.5 ft culvert with 3 ft culvert. Construct rolling dip.
D22	Replace existing 1.5 ft culvert with 3.5 ft culvert. Construct critical dip and rolling dip.
D23	Replace existing 2 ft culvert with 3.5 ft culvert. Construct rolling dips.
D25	Replace existing 4 ft culvert with 5.5 ft culvert. Construct rolling dips.
D27	Remove fill and 2 ft culvert.
D28	Remove fill and 1.5 ft culvert. Construct water bar.
D29	Remove fill and 2 ft culvert. Construct water bar.
D30	Construct water bars.
D32	Remove fill and 2 ft culvert. Construct water bar.
D34	Remove fill and 1.5 ft culvert. Construct water bar.
D35	Remove fill and 1.5 ft culvert. Construct water bar.
D36	Remove fill and 2 ft culvert. Construct water bar.
D37	Remove fill and 2 ft culvert.
D38	Remove fill and 1.5 ft culvert. Construct water bars.
D43	Construct water bar.
D44	Remove fill and 2 ft culvert. Construct water bar.
D45	Remove fill and 1.5 ft culvert. Construct water bar.
D46	Remove fill and 2 ft culvert. Construct water bar.
D47	Remove fill and 2 ft culvert. Construct water bars.
D48	Remove fill and 2 ft culvert. Construct water bars.
D49	Remove fill and 2 ft culvert. Construct water bar.
D50	Remove fill and 3 ft culvert. Construct water bars.

D51	Remove fill and 2 ft culvert. Construct water bar.
D52	Remove fill and 2 ft culvert. Construct water bar.
D53	Remove fill and 1.5 ft culvert.
D54	Remove fill and 1.5 ft culvert. Construct water bar.
D55	Remove fill and 2 ft culverts.
D56	Remove fill and 2 ft culverts.
D57	Remove fill and 2 ft culvert. Construct water bars.
D58	Replace existing 2 ft culvert with 3.5 ft culvert. Construct armored rolling dips.
D59	Replace existing 1.5 ft culvert with 3.5 ft culvert. Construct rolling dip.
D60	Remove fill and 1.5 ft culvert. Construct water bar.
D61	Replace existing 2 ft culvert with 4 ft culvert. Construct critical dip and rolling dip.
D62	Replace existing 1.5 ft culvert with 2.5 ft culvert. Construct rolling dips.

TRADE

For Waiver compliance, a trade is proposed to replace six legacy sediment sites located in the project area that are moderate-low priority (Table 3) for 19 sites located outside the project area on five closed roads that are moderate-high to high priority⁶ (Table 4). The fill volume for the sites traded away is estimated to be about 8,000 cubic yards, while the fill volume for the 19 sites proposed to be added is estimated to be about 5,000 cubic yards. The moderate-high priority sites are not maintained, and it is assumed that the risk of sediment delivery to a waterbody due to a road failure is greater on an unmaintained road as compared to a maintained road. The eleven proposed high priority sites are all located on closed road 29N46; this area is geologically unstable as is apparent from the numerous pistol-butt trees (cover photo). Owing to the fact that the sites on road 29N46 are located on a closed road in an unstable area, it is assumed that the sediment delivery caused by a road failure will likely produce significantly more sediment than just the calculated fill volume of the stream crossings⁷. It is therefore concluded that the proposed treatments provide an equal or greater benefit to water quality as required by finding no. 34 of the Waiver.

Table 3. Legacy sediments sites inside the project area that are proposed to be traded away.⁸

ID	Latitude	Longitude	Fill Volume ⁴	Comments	Priority
D02	40.3167	-123.1043	381	inside project area, open road	Moderate-low
D03	40.3570	-123.0984	897	inside project area, open road	Moderate-low
D04	40.3507	-123.1111	2960	inside project area, open road	Moderate-low

⁶ If the trade is approved, then the five closed roads would be hydrologically closed (the fill and culverts would be removed, and natural hydrology of hillslopes would largely be restored. If the trade is not approved, the roads would not have to be hydrological closed to comply with the Waiver.

⁷ When a road crossing fails, the quantity of potential sediment delivery can be estimated by estimating the volume of stream crossing fill and assuming the entire volume could enter the stream if the drainage diverted and the crossing failed; however, in most crossing failures, the amount of sediment entering the stream exceeds the volume of the fill (US EPA, 1998).

⁸ These sites will still be analyzed for treatment. They may be treated in the future (if funding is available) even though treatment will not be required if the trade is approved.

Legacy Sediment Site Report for the Dubakella Plantations Insect and Disease Project

D13	40.4016	-123.0307	845	inside project area, open road	Moderate-low
D14	40.3497	-123.1262	2165	inside project area, open road	Moderate-low
D25	40.3327	-123.1055	428	inside project area, open road	Moderate-low

Table 4. Legacy sediment sites located outside the project area that are proposed for treatment for Waiver compliance.

ID	Latitude	Longitude	Fill Volume	Comments	Priority
D30	40.3564	-123.1123	0	outside project area, closed road	Moderate-high
D32	40.3502	-123.1361	75	outside project area, closed road	Moderate-high
D35	40.4294	-123.0171	385	outside project area, closed road	Moderate-high
D37	40.3569	-123.1145	711	outside project area, closed road	Moderate-high
D38	40.3583	-123.1156	340	outside project area, closed road	Moderate-high
D44	40.3649	-123.1262	119	outside project area, closed road	Moderate-high
D45	40.3666	-123.1346	258	outside project area, closed road	High
D46	40.3670	-123.1350	760	outside project area, closed road	High
D47	40.3715	-123.1377	44	outside project area, closed road	High
D48	40.3739	-123.1393	152	outside project area, closed road	High
D49	40.3742	-123.1398	146	outside project area, closed road	High
D50	40.3752	-123.1408	440	outside project area, closed road	High
D51	40.3759	-123.1420	137	outside project area, closed road	High
D52	40.3757	-123.1434	704	outside project area, closed road	High
D53	40.3749	-123.1448	46	outside project area, closed road	High
D54	40.3746	-123.1455	332	outside project area, closed road	High
D55	40.3734	-123.1463	119	outside project area, closed road	High
D56	40.3734	-123.1498	256	outside project area, closed road	Moderate-high
D57	40.3709	-123.1524	412	outside project area, closed road	Moderate-high

REFERENCES

- California Regional Water Quality Control Board, North Coast Region. 2015. Waiver of Waste Discharge Requirements for Nonpoint Source Discharges Related to Certain Federal Land Management Activities on National Forest System Lands in the North Coast Region.
- Ries III, K.G., J.K. Newson, M.J. Smith, J.D. Guthrie, P.A. Steeves, T.A. Haluska, K.A. Kolb, R.F. Thompson, R.D. Santoro, and H.W. Vraga. 2017. StreamStats, version 4. U.S. Geological Survey Fact Sheet 2017-3046.
- U.S. Department of Agriculture, Forest Service. 1995. Shasta-Trinity National Forest Land and Resource Management Plan.
- U.S. Department of Agriculture, Forest Service. 2017. Draft Region 5 FSH 2509.22 Soil and Water Conservation Handbook, Chapter 10.
- U.S. Environmental Protection Agency, Region 9. 1998. South Fork Trinity River and Hayfork Creek sediment total maximum daily loads.
- Weaver, W.E., E.M. Weppner, and D.K. Hagans. 2015. Handbook for forest, ranch and rural roads: a guide for planning, designing, constructing, reconstructing, upgrading,

maintaining and closing wildland roads (Rev. 1st ed.). Mendocino County Resource Conservation District, Ukiah, California.

APPENDIX A: DUBAKELLA SUBWATERSHED LEGACY SEDIMENT SITE MAP

APPENDIX B: STREAM CROSSING UPGRADE GUIDE FOR NEPA PROJECTS ON THE WEST SIDE OF THE SHASTA-TRINITY NATIONAL FOREST

DRAFT